IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Badyal et al.	Art Unit	: 1762
Serial No.	: 10/502,458	Examiner	: Ramsey E. Zacharia
Filed	: July 22, 2004	Conf. No.	: 3687
Title	: NOVEL PROCESS FOR COATING INHALATION DEVICES		

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AMENDED BRIEF ON APPEAL

SUPPLEMENTAL APPEAL BRIEF

This Amended Brief on Appeal is in response to the Notification of Non-Compliant Appeal Brief mailed on May 30, 2007. The Status of the Claims section has been revised to include the status of all of the claims.

(1) Real Party in Interest

The Real Party in Interest is AstraZeneca AB, SE-151 85 Södertälje, SWEDEN.

(2) Related Appeals and Interferences

There are no pending related appeals or interferences.

(3) Status of Claims

Claims 1, 3-7 and 9-15 are pending. Claims 2 and 8 have been canceled. Claims 1, 3-7 and 9-15 are rejected and under appeal.

(4) Status of Amendments

All previously filed amendments have been entered. No amendments are being submitted herewith.

(5) Summary of Claimed Subject Matter

Claim 1 features a device for dispensing a drug by inhalation wherein the device or components thereof are coated by a cold plasma coating process characterized in that the coating is a fluorinated acrylate compound selected from the group consisting of 1H, 1H, 2H, 2H heptadecafluorodecyl acrylate, 1H, 1H, 2H, 2H perfluoroctyl acrylate, 1H, 1H, 2H, 2H perfluoroctyl methacrylate and mixtures thereof. (Applicants' published application, paragraphs [0008] and [0014].)

In some implementations, the device may include a can (claim 3), a stem (claim 4) an actuator (claim 5) or seals (claim 6) which are coated. (Applicants' specification, paragraph [0016].) In some cases, the drug is selected from the group consisting of mometasone, ipratropium bromide, tiotropium and salts thereof, salemeterol, fluticasone propionate, beclomethasone dipropionate, reproterol, clenbuterol, rofleponide and salts, nedocromil, sodium cromoglycate, flunisolide, budesonide, formoterol fumarate dihydrate, blends of budesonide and formoterol, 3-[2-(4-hydroxy-2-oxo-3H-1,3-benzothiazol-7-yl)ethylamino]-N-[2-[2-(4-methylphenyl)ethoxy)ethyl]propansulphonamide, terbutaline, terbutaline sulphate, salbutamol base and sulphate, fenoterol, 3-[2-(4-Hydroxy-2-oxo-3H-1,3-benzothiazol-7-yl)ethylamino]-N-[2-[2-(4-methylphenyl)ethoxy]ethyl]propanesulphonamide, and hydrochloride (claim 7). (Applicants' specification, paragraph [0017].)

In another aspect, recited in claim 9, Applicant's invention features a coating process which comprises coating at least a portion of a drug delivery device with a fluorinated acrylate, selected from the group consisting of 1H, 1H, 2H, 2H heptadecafluorodecyl acrylate, 1H, 1H, 2H, 2H perfluoroctyl acrylate, 1H, 1H, 2H, 2H perfluoroctyl methacrylate, and mixtures thereof, using a cold plasma. (Applicants' specification, paragraphs [0008] and [0014].)

The invention also features a drug delivery device, as recited in claim 14. The drug delivery device includes a device body and components configured to deliver a drug by inhalation. The device body and/or one or more of the components is/are coated by a cold plasma coating process with a coating comprising a fluorinated acrylate compound selected from the group consisting of 1H, 1H, 2H, 2H heptadecafluorodecyl acrylate, 1H, 1H, 2H, 2H

perfluorooctyl acrylate, 1H, 1H, 2H, 2H perfluorooctyl methacrylate, and mixtures thereof. (Applicants' specification, paragraphs [0008] and [0014].)

(6) Grounds of Rejection to be Reviewed on Appeal

Claims 1, 3-7 and 9-15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Warby combined with Badyal.

(7) Argument

Claims 1, 3-7 and 9-15 are patentable over Warby combined with Badyal

Applicants have found that the use of the particular fluorinated acrylates recited in claim 1 in coating surfaces of a delivery device significantly reduces drug adhesion to the coated surfaces. Applicants respectfully submit that the Examiner has not established a *prima facie* case of obviousness as applied to Applicants' claimed invention and therefore traverse the outstanding rejection.

The Examiner acknowledges that Warby does not teach the use of a fluorinated acrylate. At issue is whether, in view of Badyal, it would have been obvious to modify Warby to utilize a fluorinated acrylate. Applicants respectfully submit that such a modification would not have been obvious to one of ordinary skill in the art.

To establish a *prima facie* case of obviousness, the Examiner must establish (1) that the prior art reference (or references when combined) teach or suggest all the claim limitations; (2) that there is some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or references, or to combine reference teachings; and (3) that there is a reasonable expectation of success. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure. (MPEP §2143).

With regard to requirements (2) and (3) above, there is no motivating disclosure in the references of record that would have led one of ordinary skill in the art to look to Badyal when considering modifications to the coatings described in Warby. There is, in fact, nothing in the art of record that would have led the artisan to believe that the coatings described in Warby needed

any improvement. Nor would the artisan have had a reasonable expectation of success in substituting the compound of Badyal for those used in Warby.

The Examiner asserts that the disclosure in Example 3 of Badyal of plasma polymerization of 1H, 1H, 2H, 2H-heptadecafluorodecyl acrylate would have motivated a person of ordinary skill in the art to use this particular acrylate in the cold plasma coating process disclosed by Warby. Applicants believe that this is a clear use of impermissible hindsight, and the impermissible "obvious to try" standard.

The Examiner contends that the motivation to modify Warby's coatings to include the monomer of Example 3 of Badyal is that "the coating of Badyal serves the same purpose as that of Warby (i.e., a repellent coating for biomedical devices)" and that "one skilled in the art would be further motivated to use the monomer of Badyal to improve the repellency since Badyal et al. teach that the degree of repellency is a function of the length of the fluorocarbon groups." Applicants disagree with these contentions.

With regard to the Examiner's first contention, the purposes served by the coatings are not the same at all. Warby's coating is intended to inhibit deposition of a drug on the surface of a drug delivery device, while Badyal's coatings are intended to impart oil and water repellency, particularly to a fabric. Badyal does not suggest that his coatings would be useful in inhibiting drug deposition on a surface of any kind. The Examiner directs Applicants' attention to p. 10, lines 9-14 of Badyal, which contain the only reference to anything remotely drug-related in the entire reference: Badyal's mention that "In particular, the substrates are fabrics but they may be solid materials such as biomedical devices." A biomedical device could be anything from an implant to a catheter, and thus the two words "biomedical devices" would not have suggested anything to the artisan regarding the suitability of the coatings for use in Warby's application. Throughout Warby, the substrates referred to are fabrics, and it is fabrics that are used in each of Warby's examples that involve the application of coatings (Examples 2, 4 and 5.)

With regard to the Examiner's second contention, at most Badyal suggests that chain length increases oil and water repellency, which for the reasons discussed above would not have led the artisan to look to Badyal in the first place, or to believe that Badyal's compound would be suitable for use in Warby's coating process or effective in inhibiting drug deposition as required by Warby's application.

Moreover, if Badyal would in fact have suggested "that the degree of repellancy is a function of the length of the fluorocarbon groups," as contended by the Examiner, why would such a suggestion have led the artisan to replace the monomers described by Warby with the entirely different compounds taught by Badyal? If anything, the artisan would more likely have simply extended the length of the monomers used by Warby, which Warby indicates to be effective in his application. The preferred monomers described in Warby, for example in the passage below, do not include polar moieties such as are present in the acrylates disclosed in Badyal:

> The preferred monomers to use in this process are perfluoro-cyclohexane or perfluoro-hexane which would create a thin layer of plasma polymerisedfluoro- cyclohexane or fluoro-hexane on the appropriate surface. Other fluorinated hydrocarbons may also be used, such as tetrafluoroethylene (TFE), trifluoroethylene, vinylidene fluoride and vinyl fluoride. The two monomers fluoroethylene and fluoropropylene may also be used to form the copolymer fluorinated ethylene-propylene (FEP). As a further alternative, siloxanes may be used, such as dimethyl siloxane, to give a layer of plasma polymerised dimethylsiloxane. (See page 7 of Warby.)

Accordingly, the modification suggested by the Examiner, i.e., that of increasing chain length, would not have led the artisan to replace the monomers of Warby with those disclosed in Badyal, which include polar moieties such as esters and amides.

Applicants respectfully submit that the Examiner has simply used the Applicants' claims as a roadmap to make an artificial connection between disparate art in order to reject the Applicants' claims. It is axiomatic that obviousness cannot be established by simply stitching together disparate pieces of prior art using the Applicant's claims as a template (see, e.g., Interconnect Planning Corp. v. Feil, 774 F.2d 1132; Loctite Corp. v. Ultraseal Ltd., 781 F.2d 861; and In re Fine, 837 F.2d 1071) because Applicants' claims are not disjointed lists of elements, but present an invention that must be considered *as a whole* (see, e.g., MPEP 2141.02, and Stratoflex, Inc. v. Aeroquip, 713 F.2d 1530).

The Examiner states, in the Response to Arguments section of the Final Office Action, that "Warby explicitly refers to his cold plasma polymerization coating as a 'hydrophobic' treatment" and "therefore, one skilled in the art would be motivated to look to other hydrophobic

treatments." There is simply no reason why the artisan would have been motivated to look for other hydrophobic treatments, when Warby indicates that his coatings provide good results.

The Examiner contends that comparative data in Examples 2 and 4 of Badyal "illustrates that the acrylate coating of Badyal actually exhibits a greater hydrophobic nature than a coating formed from a fluorinated alkene monomer." (See Advisory Action.) However, the data in these Examples would have told the artisan nothing about the relative hydrophobicity that would be exhibited by surfaces of a drug delivery device such as that of Warby when cold plasma coated with different fluorinated coatings. Instead, the data pertains specifically to the relative oil and water repellancy of coated cotton.

In view of the above remarks, Applicants respectfully request that the outstanding rejection be reversed and all claims be allowed.

The $500 brief fee was previously charged on April 25, 2007. No additional fees are believed to be due at this time. If any fees or charges are deemed necessary, please apply the charges or credits to Deposit Account No. 06-1050, referencing Attorney Docket No. 06275-408US1.

Respectfully submitted,

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Appendix of Claims

1. A device for dispensing a drug by inhalation wherein the device or components thereof are coated by a cold plasma coating process characterized in that the coating is a fluorinated acrylate compound selected from the group consisting of 1H, 1H, 2H, 2H heptadecafluorodecyl acrylate, 1H, 1H, 2H, 2H perfluoroctyl acrylate, 1H, 1H, 2H, 2H perfluoroctyl methacrylate and mixtures thereof.

3. A device according to claim 1 in which the device comprises a can and the can is coated.

4. A device according to claim 1 in which the device comprises a stem and the stem is coated.

5. A device according to claim 1 in which the device comprises an actuator and the actuator is coated.

6. A device according to claim 1 in which the device comprises seals and the seals are coated.

7. A device according to claim 1 in which the drug is selected from the group consisting of mometasone, ipratropium bromide, tiotropium and salts thereof, salemeterol, fluticasone propionate, beclomethasone dipropionate, reproterol, clenbuterol, rofleponide and salts, nedocromil, sodium cromoglycate, flunisolide, budesonide, formoterol fumarate dihydrate, blends of budesonide and formoterol, 3-[2-(4-hydroxy-2-oxo-3H-1,3-benzothiazol-7-yl)ethylamino]-N-[2-[2-(4-methylphenyl)ethoxy)ethyl]propansulphonamide, terbutaline, terbutaline sulphate, salbutamol base and sulphate, fenoterol, 3-[2-(4-Hydroxy-2-oxo-3H-1,3-benzothiazol-7-yl)ethylamino]-N-[2-[2-(4-methylphenyl)ethoxy]ethyl]propanesulphonamide, and hydrochloride.

9. A coating process which comprises coating at least a portion of a drug delivery device with a fluorinated acrylate, selected from the group consisting of 1H, 1H, 2H, 2H heptadecafluorodecyl acrylate, 1H, 1H, 2H, 2H perfluorooctyl acrylate, 1H, 1H, 2H, 2H perfluorooctyl methacrylate, and mixtures thereof, using a cold plasma.

10. The process of claim 9 wherein the medicinal device is constructed to deliver a drug by inhalation.

11. The process of claim 9 wherein the portion of the drug delivery device that is coated comprises a component of the drug delivery device.

12. The process of claim 11 wherein the component is selected from the group consisting of a canister, a stem, a seal, a valve component, a measuring chamber and an actuator.

13. The process of claim 9 wherein the drug delivery device is configured to deliver a drug selected from the group consisting of mometasone, ipratropium bromide, tiotropium and salts thereof, salemeterol, fluticasone propionate, beclomethasone dipropionate, reproterol, clenbuterol, rofleponide and salts, nedocromil, sodium cromoglycate, flunisolide, budesonide, formoterol fumarate dihydrate, blends of budesonide and formoterol, 3-[2-(4-hydroxy-2-oxo-3H-1,3-benzothiazol-7-yl)ethylamino]-N-[2-[2-(4-methylphenyl)ethoxy)ethyl]propansulphonamide, terbutaline, terbutaline sulphate, salbutamol base and sulphate, fenoterol, 3-[2-(4-Hydroxy-2-oxo-3H-1,3-benzothiazol-7-yl)ethylamino]-N-[2-[2-(4-methylphenyl)ethoxy]ethyl]propanesulphonamide, and hydrochloride.

14. A drug delivery device comprising:

a device body; and

components configured to deliver a drug by inhalation;

wherein the device body and/or one or more of the components is/are coated by a cold plasma coating process with a coating comprising a fluorinated acrylate compound selected from

the group consisting of 1H, 1H, 2H, 2H heptadecafluorodecyl acrylate, 1H, 1H, 2H, 2H perfluorooctyl acrylate, 1H, 1H, 2H, 2H perfluorooctyl methacrylate, and mixtures thereof.

15. The device of claim 14 wherein the components are selected from the group consisting of a canister, a stem, a seal, a valve component, a measuring chamber and an actuator.

Evidence Appendix

None

Related Proceedings Appendix

None.